

## **ISE364 Introduction to Machine Learning Fall 2019**

Instructor: Dr. Louis Plebani  
Phone: 610.758.4038  
Fax: 610.758.4886  
email: ljp2@lehigh.edu

Office Hours: MW 1:00 - 3:00  
or by appointment  
or any time you see  
me

### **Text:**

No textbook is required. Students will be assigned readings from Internet accessible sources.

### **Course Description**

Machine learning is a study of computer programs involved with pattern recognition and automatically improving the programs themselves in the field of artificial intelligence. This is an introductory course of machine learning designed for undergraduate students who have working knowledge of programming and sufficient knowledge of probability and statistics. The Machine Learning course teaches the core principles and prepares for more advanced machine learning courses.

Machine learning improves the current programs by designing them to advance performance automatically through experience. For example, machine learning can be used to predicting diseases, recognizing patterns, detecting anomalies, or driving autonomous vehicles.

This course focuses on the statistical and computational foundations of machine learning core principles. It introduces the big picture of assumptions in machine learning. Emphasis will be placed on programming of algorithms. Topics include Naive Bayes, decision tree, logistic & linear regression, perceptron, kernels, and some advanced topics such as neural networks, deep learning, etc.

### **Prerequisites:**

Math 205  
Math 231 or ISE 111  
ISE 230  
ISE 240  
ISE 172

### **Contacting the Instructor**

I am usually in my office or somewhere on the fourth floor of Mohler Lab. You may stop and see me at any time.

## Grading Policy

Grades will be determined according to the following schedule. Plus/minus grading will be used for final grades

Homework/Projects:	50%
Quizzes:	30%
Instructor Discretion:	20%

## Collaboration

Individual work is expected unless an assignment specifies a group or partner can be used. It is not acceptable to take someone else's work and make changes prior to submission. It is okay to exchange ideas or to get help debugging. However, once you are writing code, it should be your own. Individuals violating this policy will be referred to that University Committee on Discipline

## Course Topic Areas

We will cover a potpourri of machine learning topics drawn from the list below. Content and pace will be adjusted in order to adapt to course dynamics.

- Python Review
- Python for Data Analysis - NumPy, Pandas
- Python for Data Analysis - Pandas
- Python for Data Visualization - Matplotlib, Seaborn
- Linear Regression
- Cross Validation and Bias-Variance Trade-Off
- Logistic Regression
- K Nearest Neighbors
- Decision Trees and Random Forests
- Support Vector Machines
- K Means Clustering
- Principal Component Analysis
- Recommender Systems
- Big Data and Spark with Python
- Neural Nets and Deep Learning

## Accommodations for Students with Disabilities

Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a

Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible. For more information or to request services, please contact Disability Support Services in person in Williams Hall, Suite 301, via phone at 610-758-4152, via email at [indss@lehigh.edu](mailto:indss@lehigh.edu), or online at <https://studentaffairs.lehigh.edu/disabilities>.

## **Principles of Equitable Community**

Lehigh University endorses The Principles of Our Equitable Community [[http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity\\_Sheet\\_v2\\_032212.pdf](http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity_Sheet_v2_032212.pdf)]. We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.